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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Patent application of:

Applicant(s):	Kai Numssen et al.
Serial No:	10/684,811
Filing Date:	October 14, 2003
Title:	METHOD FOR MANUFACTURE OF A HIGH TEMPERATURE SUPERCONDUCTING LAYER
Examiner:	Talbot, Brian K
Art Unit:	1762
Docket No.	BARDP0124US

REPLY TO EXAMINER'S ANSWER

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The undersigned submits this reply to the Examiner's Answer. Initially, the Examiner's withdrawal of the rejection based on *Nagaishi* is noted with appreciation.

In the "Response to Argument" section of the Examiner's Answer, the Examiner takes issue with the applicants' position that the skilled person would not have been led to combine *Kwon*, *Groves* and *Hintermaier* in a manner giving rise to the claimed subject matter in view the differences between the processes and materials of *Kwon*, *Groves* and *Hintermaier*. Because of these differences, the skilled person could not have reasonably predicted the beneficial results obtained from the subject matter of the claims. The Examiner provides no evidence that a methodology applied to specific

materials for a given purpose has any applicability to a different methodology applied to different materials.

For instance, *Kwon* and *Groves* suggest using different deposition processes for a buffer layer. One of ordinary skill in the art would be well aware that a laser deposition process will lead to structural properties of the film that differ from those obtained with an ion beam assisted disposition process. Consequently, the person skilled in the art would not combine *Kwon* and *Groves* even if *Kwon* were to disclose deposition of a buffer layer according to claim 1.

The Examiner's reasoning regarding the propriety of the combination of *Kwon* and *Groves* appears to be premised on a misinterpretation of the cited passage at column 6, lines 4-15, of *Groves*. The problem underlying *Groves* is to provide template layers for the subsequent deposition of thin films such as YBCO. To overcome the drawbacks in the state of the art related with magnesium oxide layers deposited by ion beam assisted deposition (IBAD) and used for such template layers, *Groves* teaches to use a dual ion beam assisted deposition process (DIBAD) to deposit an amorphous oxide, nitride or oxide nitride material layer. This improves elimination of the effect of texture degradation beyond the critical thickness of about 10 nm observed in single IBAD of magnesium oxide, cf. column 3, lines 1-5. Only as a minor aspect, in particular in example 1 (the only example given), *Groves* teaches to overcoat the magnesium oxide film produced with dual ion beam assisted deposition with heteroepitaxially deposited subsequent buffer and YBCO layers. The only teaching in this respect is to deposit a first layer of 50 nm of YSZ followed by 20 nm of Yttria, cf. column 6, lines 4-18. These buffer layers are used to obtain improved lattice matching with a final YBCO

film. That is to say, the clear teaching of *Groves* is to provide an Yttria film between the top YBCO film and the underlying buffer layer.

In contrast, claim 1 recites a method where an $XBa_2C4_3O_7$ layer is deposited onto <u>an $RBa_2Cu_3O_7$ layer</u>. Accordingly, the person skilled in the art cannot receive even a hint from *Groves* to consider the rates described in this example as having applicability to the method set forth in claim 1. One cannot predict what might occur in the absence of the intermediary buffer layer of *Groves*.

Accordingly, no reasonable combination of *Kwon* and *Groves* can yield the method of claim 1.

The same applies when adding *Hintermaier*. *Hintermaier* relates to the deposition of thin <u>ferro-electric films</u> such as strontium bismuth tantalate (SPT). To overcome the drawbacks of the deposition methods used in the prior art, *Hintermaier* suggests to use a chemical vapor deposition process (CVD). In fact, *Hintermaier* mainly refers to a sophisticated selection of suitable precursors for use in the CVD process. Only as a minor aspect, namely at column 10, lines 22-30, to which reference is made by the Examiner, *Hintermaier* suggests that it might be helpful to have a nucleation control in the beginning, even if this decreases the growth rate. However, such a nucleation control, which is also well known in the prior art, has nothing in common with a buffer layer using a <u>different material</u> deposited at a different rate. While *Hintermaier* teaches to use a commonly known "seeding" or nucleation process to improve the film properties, such teaching is contrary to the claimed use of a <u>different</u> buffer layer.

Furthermore, *Hintermaier* uses a CVD deposition process which is clearly different from the ion beam assisted deposition process or the laser ablation deposition process. Accordingly, even in the hypothetical case that *Hintermaier* would disclose a buffer layer contrary to a seeding process, the person skilled in the art will not be able to simply combine these different deposition processes. In this respect it is noted that the deposition temperature in a CVD deposition process is rather high, for instance about 450° Celsius, cf. column 9, line 57 of *Hintermaier*, so that the film formation will significantly differ from the film formation using a laser ablation or ion beam assisted deposition process which do not require substrate heating. Moreover, the materials used in *Hintermaier* significantly differ from the materials used in high temperature super conductors. Therefore, film formation is very likely to be significantly different.

In response to the applicant's argument that *Kwon*, *Groves* and *Hintermaier* relate to different materials and processes, the Examiner argues at page 5, 2nd paragraph, that *Kwon* teaches the formation of multiple ReBCO superconductor layers with the first layer being a buffer layer including ReBCO or YSZ. Applicants disagree.

According to column 3, lines 14+ of *Kwon*, the base substrate may be a composite with a suitable buffer layer upon the metal surface, and such buffer layer preferably be a material such as YSZ or magnesium oxide. That is to say, this YSZ or magnesium oxide layer is part of the substrate. However, this "buffer layer" is different from the buffer layer according to the teaching of lines 23-25 of column 3, which relates to a superconducting material. Accordingly, figure 2 which shows the difference of the susceptibility between the two examples with and without a buffer layer does not refer to the buffer layer (MgO or YSZ) according to lines 14-18 of column 3, but instead to

the buffer layer according to lines 22-25 of column 3. In fact, figure 2 as well as figure 3 do not compare the properties with and without an YSZ film or a MgO film (which is part of the substrate and is not varied in the examples shown in the figures). To the contrary, these figures compare the effect with and without a superconducting buffer between the YSZ film and the superconducting top layer. Therefore, the teaching of *Kwon* to deposit a YSZ layer at a lower growth rate cannot be combined with the teaching of *Groves* with respect to a buffer layer (different from YSZ).

In view of the foregoing and applicants' main brief, it is respectfully submitted that the claims are patentable over the applied art and that the rejections advance by the Examiner should be reversed.

Respectfully submitted,

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By: ______________________
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CERTIFICATE OF MAILING

I hereby certify that this correspondence (along with any paper referenced as being enclosed) is being deposited with the United States Postal Service on the date shown below as first class mail with sufficient postage in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date: September 3, 2008

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Don W. Bulson